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# इपिर्टि न्यूज़ IPIRTI NEWS

Delivering Innovative Solutions for Industry, Society and Environment



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## RESEARCH ADVISORY COMMITTEE MEETING, IPIRTI, BANGALORE



A view of RAC Meeting chaired by Mr. Sajjan Bhajanka, M.D. M/s. Century Plyboards (India) Ltd., Kolkata  
58<sup>th</sup> meeting of the Research Advisory Committee (RAC) of IPIRTI held on 7<sup>th</sup> March 2014 in the Conference Hall at IPIRTI, Bangalore

Highlights of RAC Meeting:

Shri. K. S. Reddy, *IFS*, Director IPIRTI, welcomed the Chairman, RAC, Shri. Sajjan Bhajanka, M.D. M/s. Century Plyboards (India) Ltd., Kolkata and all the members of RAC present in the meeting. He expressed his gratitude for the Chairman's keen association with IPIRTI and requested the RAC members to critically examine all the projects and suggest any modifications in the projects.

Shri. Sajjan Bhajanka, Chairman, RAC, welcomed all the members, scientists, bureaucrats and foresters present in the meeting.

The Chairman informed that imports of panel products have been totally stopped from China and that there is recession in Indian economy and the industries are struggling to survive. While citing the changes taking place in the country and world over, he said that now it is time to reflect on our roles. He also said that, IPIRTI should suggest import substitution and some cheaper cost effective technologies to develop environment friendly products, which are the need of the hour.

### **Technical Session:**

Dr. Nath, Joint Director, welcomed all the members present in the meeting. He made a power point presentation on the progress of work since last RAC meeting.

With the permission of the Chair, the Agenda items were taken up for discussions.

Out of the 37 Institute funded projects, 12 projects have been completed and 3 Research Reports are published, 4 project reports are under publication and 5 project reports are under vetting.

Out of 13 Project Proposals submitted, only following 10 project proposals are approved in the RAC Meeting:

1. Development of fire retardant composite products
2. Development of wood plastic composite
3. Development of suitable preservative treatment process for wood-based composites with supercritical  $\text{CO}_2$  impregnation system
4. Investigation on the susceptibility of various panel products to wood-deteriorating biological agents
5. Development of particle board and fibre board from Cassava stem and sun flower stalk (Resubmission)
6. Development of New and improved extender for plywood adhesive having Extender – Scavenger dual function to make less toxic and more eco-friendly (Resubmission).
7. Study on the physical and mechanical properties of strands obtained by disintegration of bamboo strip for manufacture of moulded product.
8. Selection criteria and optimization of parameters of wooden frames used in Fire rated doors of different ratings.



9. Study on the effect of density variation through thickness on properties of three layer particle board.
10. Development of light weight building components using foaming materials for various applications.

The following new sponsored projects were placed before RAC for ratification:

1. A study on efficacy of Nano Inorganic Antimicrobial material in manufacture of panel products as wood preservative.
2. Efficacy study of Booster Additive as an extender for phenolic and amino resins for manufacture of plywood.
3. A study on efficacy of new herbal wood preservative chemicals against termites.
4. Weathering Studies on solid wood. (collaborative project).
5. Testing and Evaluation of Physical, Mechanical and Working Properties of Six Canadian Softwood Species.
6. To Study the Techno-Economic Feasibility for the Development and Commercialization of Particle Board from Jute Sticks.
7. Establishment of process for Bamboo Strand Lumber and common facility centre at foot hills of Shivalik, Talwara Forest (Hoshiapur)-Punjab.
8. Polyurethane based adhesives for bonding wood based products.

The technical session concluded with the presentation on the progress of ongoing projects by the concerned scientists.

Dr. Nath, joint Director, IPIRTI extended the vote of thanks.

#### **IPIRTI Research Reports published**

1. Development of alternative preservative treatment procedure for marine/shuttering grade plywood (RR. No. 168)
2. Development of Soya based resin for the manufacture of plywood (RR. No 169)
3. Development of Medium Density fibre board (MDF) from plantation grown timber species *Grevilea robusta* ( Silver Oak) – Phase-1 (RR. No 170)

#### **संस्थान में हिन्दी की गतिविधियाँ**

हिन्दी प्रबोध प्रशिक्षण कार्यक्रम इपिर्टी में 21 जनवरी 2014 से शुरु हुआ है, और इसमें संस्थान से 16 कर्मचारी प्रशिक्षण ले रहे हैं ।

## RESEARCH & DEVELOPMENT

### EFFECT OF CASSAVA FLOUR AS AN EXTENDER IN UF AND PF RESIN ON THE BOND QUALITY OF PLYWOOD

Extenders are added to an adhesive formulation to reduce resin consumption leading to cost saving. Dr. Ranjana Yadav, Officer In-Charge, IPIRTI Centre Mohali and her team explored Cassava flour (98 percent starch) as an extender for the manufacture of different grades of plywood. Phenol Formaldehyde (PF) and Urea Formaldehyde (UF) resins were synthesized in the laboratory and cassava flour was added to the PF and UF resin in adhesive mix for exterior and

interior grade plywood manufacturing on a laboratory press. Extender was incorporated in different percentage in the range of 5-25 percent of resin weight. Urea formaldehyde resin and Conventional Phenol formaldehyde resin extended with 20 and 25 percentage of Cassava flour has given satisfactory results conforming to MR and BWP grade plywood as per IS 848:2006-Specification for synthetic resin adhesive for plywood (Phenolic and Amino Plastics).

### POLYURETHANE BASED BIO-ADHESIVE FOR BONDING WOOD

A study to manufacture the blocked isocyanate resin suitable for bonding plywood was taken up by Dr. S.K.Nath, Joint Director & his team at IPIRTI, Bangalore. The blocked isocyanate resin was prepared using phenol and cresol as blocking agents. FTIR analyses confirms the blockage of the isocyanate ( $-NCO$ ) group. DSC curing characteristics augments the curing at 160-180°C.

Plywood were manufactured using blocked resin and also with the combinations of Phenol Formaldehyde (PF) and bio adhesives like phenol cardanol formaldehyde (PCF) resins. The panels made with blocked resin and with the combination of PF and PCF with a curing temperature of 170<sup>0</sup>-180<sup>0</sup>C conformed to boiling water resistant grade (IS-848:2006) with predominant wood failure.

### FATIGUE STRENGTH PROPERTIES OF STRUCTURAL PANELS

In this study fatigue resistance of four different types of Panel products of Boiling Water Proof (BWP) Grade viz; Laminated Veneer Lumber (LVL), Structural Plywood, Bamboo Mat Board (BMB) and Shuttering Plywood were investigated by Mr. Kiran, Scientist and his team at IPIRTI, Bangalore for determining the allowable design stresses for these materials as a percentage of Ultimate strength (Modulus of Rupture). Specimens were tested for both Static Bending and dynamic bending (Fatigue). Constant amplitude cyclic test of 1 Hz (60 cycles/minute) frequency were performed with six applied stress levels viz; 80, 70, 60, 50, 40, 30 percentages of

the materials Modulus of Rupture (MOR). Results indicated that Laminated Veneer Lumber, Structural Plywood, Bamboo Mat Board and Shuttering Plywood were able to survive fatigue life of over 6 lakh cycles at stress level equal to 30, 27, 36 and 24% of average MOR respectively. It was also observed that increase in the Rate of loading decreased the percentage of allowable design stresses for all the material and vice versa. The study shows that the allowable design stress for the design applications must be based on percentage of static MOR and the frequency of cyclic loading in order to satisfy safety and service requirements.

*For more details, Contact: Director, IPIRTI, Bangalore.*

Visit our website at <http://www.ipirti.gov.in>

## EXTENSION

**17.01.2014:** Dr. Ranjana Yadav, Officer In-charge, IPIRTI Center, Mohali visited M/s. Star Ply Pvt. Ltd., Jalandhar to attend floor level problem of the factory.

**21.01.2014:** Dr. S.K. Nath, Joint Director and Dr. V.K. Chawla, Scientist visited Talwara Forest Region, Punjab for establishing Common Facility Centre (CFC) for Bamboo.

**23.1.2014:** Shri. Prakash. V, Scientist and D. Ravi, Mechanic visited Kandla to have interactions with the sawmill industry technicians through Kandla Sawmill Association.

**24.01.2014:** Dr. Ranjana Yadav, Officer In-charge, IPIRTI Center, Mohali visited M/s. Modern Plywood, M/s. United Timber Pvt Ltd., M/s. Haryana Industry, Kamdhenu, M/s. Haryana wood Products arranged by Shri. Jolly Singh, President, Wood Technologists Association (WTA), Yamuna Nagar.

**04.02.2014 - 08.02.2014:** Ms. Sujatha D. and Shri. Uday D.N. Scientists IPIRTI, Bangalore visited M/s. Green Ply Industries Ltd., Pantnagar, Uttarakhand for attending floor level problems in Peeling and drying of veneers.

**08.02.2014:** Dr. S.K. Nath, Joint Director and Dr. Vipin K. Chawla, Scientist visited M/s. Hindustan Paper Mill Co-operation, Assam to study the bamboo storage and harvesting technique.

**11.02.2014:** Shri. Prakash V., Scientist visited Bramhaputra Forest Products Pvt Ltd for the demonstration of Bamboo mat corrugated sheet manufacturing facility.



*Visit of Shri V.Prakash Scientist, IPIRTI to M/s. Bramhaputra Forest Products Pvt Ltd for the demonstration of Bamboo mat corrugated sheet manufacturing facility*

**17.02.2014-18.02.2014:** Dr. V.K. Upadhyay, Scientist visited Directorate General of Commercial Intelligence & Statistics, Kolkata and met Dr. D. Sinha, D.G. and Dr. Amitava Saha, Director (Data Dissemination) for 25 years data collection on the export and import of wood based panels in India.

**18.02.2014:** Shri. Uday D.N., Scientist visited M/s. Green Ply Industries Ltd., Rajkot, Gujrat for attending floor level problems in peeling and drying of veneers.



*Demonstration on peeling of plantation timber ( Eucalyptus) from spindleless lathe by Shri Uday D.N., Scientist at M/s Green Ply Industries Ltd. Uttarakhand*



**18.02.2014:** Dr. V.K. Upadhyay, Scientist visited M/s. Century ply and M/s. Green Ply Industries at Kolkata for the data collection of production, export and import of wood based panels.

**19.02.2014:** Dr. V.K. Upadhyay, Scientist visited Central Statistics Office, Industrial Statistics Wing, Ministry of Statistics and Programme

Implementation, Kolkata and met Shri. Sudipta Bhattacharya to get data on production of wood based panel in India for the period of 25 years.

**13.03.2014:** Shri. Uday D.N., Scientist visited M/s. Bemco Hydraulics, Belgaum for inspection of infrastructural facilities available as a part of technical evaluation for procurement of press.

### MEETINGS/ SEMINARS/ WORKSHOPS/ CONFERENCE

#### BoG Meeting:

121<sup>st</sup> Meeting of the Board of Governors of IPIRTI, held on 26<sup>th</sup> February 2014 at MoEF, New Delhi. The meeting was chaired by Dr. V. Rajagopalan, IAS, Secretary to Ministry of Environment and Forests, Govt. of India, New Delhi.

**06.01.2014:** Dr. Ranjana Yadav, Officer In-charge, IPIRTI Center, Mohali attended the meeting arranged by NIPMA president Shri. Naresh Tiwari with other wood industrialists of Amritsar, Hoshiarpur and Jalandhar at Sarb Multiplex, Jalandhar.

**06.02.2014-07.02.2014:** Dr. S.K. Nath, Joint Director and Dr. Vipin K. Chawla, Scientist IPIRTI, Bangalore attended National Seminar on “Recent Advances on Bamboo Research and Development in India” organized by Rain Forest Research Institute (Indian Council of Forestry Research & Education) Jorhat, Assam and presented a paper entitled “Development of Bamboo Strand Lumber”.

**21.02.2014:** Dr. S.K. Nath, Joint Director and Shri. Anand Nandanwar, Scientist attended seminar on “Applications of Canadian softwood species” at Hotel Taj West End, Bangalore.

**22.02.2014-23.02.2014:** Dr. Vipin K. Chawla, Scientist, Dr. S. K. Nath, Joint Director and

Shri. Anand Nandanwar, Scientist attended International Bamboo Conclave & Expo-2014 at University of Agricultural Sciences, GKVK, Bangalore and made Poster presentation on “Bamboo Strand Lumber: A Wood Alternative”. Bamboo Products developed at IPIRTI are exhibited in the university campus. Mr Uday D N, Scientist Presented a paper on “Technology for the manufacture of doors with Bamboo Mat Moulded Skin (BMMS). Mrs. Mamatha, Scientist anchored the entire programme.

**23.02.2014:** Ms. Sujatha D., Scientist attended International seminar on “International Bamboo Conclave & Expo-2014” as a rapporteur for a technical session at GKVK, Bangalore.

**25.02.2014:** All the Scientists of IPIRTI, Bangalore attended “India wood 2014 – Expo” at BIEC, Bangalore. Products developed at IPIRTI were exhibited in the stall.

**25.03.2014:** Shri. Narasimha Murthy, Scientist participated in CED:9 Meeting of BIS for discussion on CEB preservative chemical to incorporate in IS 401 held at FRI, Dehra Dun.

**28.03.2014:** Ms. Sujatha D., Scientist participated in the “Entrepreneur Development Workshop” at CSIR-AMPRI, Bhopal.

## TRAINING

### PGD Course:

25<sup>th</sup> batch of PGD Course on Wood and panel products technology with 28 candidates is under progress.

### SHORT TERM TRAINING COURSES

A Short term training course on “Testing of plywood and block board as per IS:303, IS:710, IS:1328, IS:4990 and IS:1659” was conducted at IPIRTI, Bangalore during 6-10 January, 2014 for nine candidates sponsored by the plywood industries at IPIRTI, Bangalore.

One month training programme on “Plywood Manufacturing Technology” was conducted during 12<sup>th</sup> February – 18<sup>th</sup> March, 2014 for five candidates sponsored by plywood industries.

Short term training course on “Testing of plywood, block board and flush door” was conducted at IPIRTI Field Station, Kolkata during 2-28 March, 2014 for five candidates sponsored by plywood industries.

Five Days Training Programme on “Skill development of Bamboo Artisans” was conducted during 10-14 March 2014 at IPIRTI, Bangalore for 17 Artisans from Karnataka which was funded by National Bamboo Mission through Karnataka Forest Development Corporation, Aranya Bhavan, Bangalore.

### Visits of Dignitaries:

**12.02.2014:** Shri. Praveen Kumar, Joint Director, BIS, Mohali visited IPIRTI Centre, Mohali along with delegates from Asia and Africa.



*Delegates from Asia & Africa at IPIRTI Centre, Mohali*

### FIRE DOOR TESTING AT IPIRTI

With the increasing building activities and stringent building regulations the behaviour of building components from various panel products or in combination with other materials against fire and to ensure occupants safety is the need of the hour. With the recent regulations relating to buildings in India, there is also a market for fire retardant wooden doors in housing applications. There are huge opportunities for developers and architects to add value to their properties through these fire retardant doors. Occupants of buildings will be the major beneficiaries as it gives them additional peace of mind and protection from fire without compromising the use of green building materials viz. wood and panel products. Keeping future requirements of building bye-laws in our country and to facilitate testing of fire check doors, the facility is being established at IPIRTI for testing fire performance of full size door/shutters as per national/ international standards such as BS 476 (part 20 and 22), IS 3614 (part 2), ISO 3008:2007 and BS EN 1634-1:2000 using latest technologies and instrumentation comparable with best in the world.

Fire doors are “rated” by time (in minutes or hours) that a door can withstand exposure to fire test conditions and the failure criteria is assessed by Integrity & Insulation. Hourly ratings include 120 minutes, 90 minutes, 60 minutes and 30 minutes with the maximum rating required of any swinging type fire door being three hours.

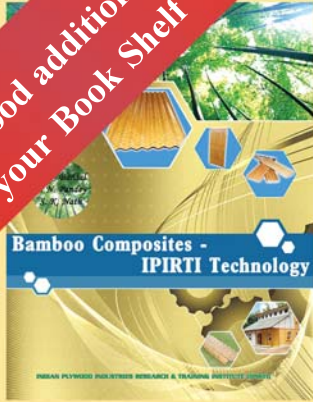
**Salient features of the fire door testing setup are:-**

- Vertical front open furnace structure with imported burners having refractory bricks & ceramic wool blanket for best heat insulation
- Computer programmable Automated LPG burners with computer controlled LPG and air flow
- Hot gas exhaust with automated damper system
- Single girder EOT crane with electric hoist
- Test frame to hold door under test with trolley and roller skid
- K- Type thermocouple assembly with data logger facility
- PC based multi-channel data logger and software controlled test.
- The system is equipped with fire-fighting and safety equipments.

**For further details please contact:**  
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 (Autonomous body of Ministry of Environment & Forests, Govt. of India)  
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## ***Bamboo Composites – IPIRTI Technologies***

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A more comprehensive book is urgently needed as many new entrepreneurs who wish to start industrial scale production of bamboo products have minimal or no knowledge about these new developments. Therefore, the primary objective of bringing out this book is to provide information on those bamboo products which have been developed at IPIRTI. The various topics are organized into chapters covering areas such as details of the products, process of manufacture, physical-mechanical properties and end uses. Suitability of various bamboo species, which are commercially available in India, for different products and their primary processing technique such as slivering, mat making and strip making have been covered in the book.

This book is an unique, attractive and valuable source of bamboo processing technologies developed at IPIRTI, Bangalore. It should be on every bamboo development practitioner's bookshelf.

Copies available at IPIRTI, Bangalore.

**Price: INR 400**

**US\$ 10.00**

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